

CLAIMS:

1. A multi-zoned processing pad assembly for processing a substrate, comprising:
 - a conductive layer;
 - an upper layer having a non-conductive processing surface coupled to the conductive layer; and
 - at least two zones of different current permeability defined across the processing surface of the upper layer, wherein the at least two zones are defined by an attribute of the upper layer.
2. The assembly of claim 1, further comprising at least one aperture formed through the upper layer and the conductive layer.
3. The assembly of claim 1, wherein the at least two zones are formed via at least two sets of a plurality of holes in at least the upper layer, wherein the holes in each set of holes have substantially equal spacing but different diameters.
4. The assembly of claim 1, wherein the at least two zones are formed via at least two sets of a plurality of holes in at least the upper layer, wherein the holes in each set of holes have substantially equal diameters but different spacing.
5. The assembly of claim 1, wherein the at least two zones are formed via at least two sets of a plurality of holes in at least the upper layer, wherein the holes in each set of holes have different diameters and different spacing.
6. The assembly of claim 1, wherein the upper layer is fabricated of a permeable material, and wherein the at least two zones is defined by portions of the upper layer having different permeability.

7. The assembly of claim 1, wherein the upper layer further comprises:
a first ring of permeable material; and
at least a second ring of permeable material coupled to the first ring,
wherein the first and second rings of permeable material have different porosity.
8. The assembly of claim 1, further comprising a subpad disposed between
the upper layer and the conductive layer.
9. The assembly of claim 1, wherein the conductive layer further comprises
a plurality of independently biasable electrical zones.
10. The assembly of claim 1, wherein the at least two zones further
comprises a first zone having a greater open area than a second zone.
11. The assembly of claim 1, wherein the at least two zones further
comprises a first zone adapted to allow a greater volume of electrolyte
therethrough relative to a second zone.
12. A multi-zoned processing pad assembly for processing a substrate,
comprising:
a conductive layer having a terminal for coupling to a power source;
a subpad coupled to the conductive layer;
an upper layer having a non-conductive processing surface coupled to
the subpad; and
at least two zones of different current permeability defined across the
processing surface of the upper layer, wherein the at least two zones are
defined by an attribute of the upper layer.
13. The assembly of claim 12, further comprising at least one aperture
formed through the upper layer, the subpad, and the conductive layer.

14. The assembly of claim 12, wherein the conductive layer further comprises a plurality of independently biasable electrical zones.

15. The assembly of claim 14, wherein the plurality of independently biasable electrical zones further comprises three independently biasable electrical zones formed by the interaction between a first conductive element and a second conductive element disposed in the conductive layer, wherein the second conductive element has an inner edge interleaved with an outer edge of the first conductive element.

16. The assembly of claim 15, wherein the at least two zones further comprises three zones aligned above the three electrical zones.

17. An apparatus for processing a substrate, comprising;
a platen assembly having a top surface;
a zoned processing pad assembly disposed on the platen assembly,
comprising:
an upper layer having a dielectric processing surface adapted to process a substrate thereon;
a conductive layer coupled to the upper layer;
at least one aperture formed through the upper layer and the conductive layer; and
at least two zones of different current permeability defined across the processing surface of the upper layer, wherein the at least two zones are defined by an attribute of the upper layer;
at least one conductive element disposed in the upper layer proximate the processing surface;
a plenum defined within the platen assembly; and
at least one fluid passage formed between the plenum and the processing surface of the pad assembly.

18. The apparatus of claim 17, further comprising:
a carrier head disposed above the processing pad assembly and adapted to hold a substrate against the processing pad assembly and provide relative motion therebetween.
19. The apparatus of claim 17, further comprising:
a fluid source coupled to the plenum adapted to provide electrolyte to the processing surface of the processing pad assembly through the at least one aperture.
20. The apparatus of claim 17, further comprising:
a power source having a first terminal coupled to the conductive layer and a second terminal coupled to the conductive element.
21. The apparatus of claim 17, wherein the zoned processing pad assembly further comprises a subpad disposed between the upper layer and the conductive layer.
22. The apparatus of claim 17, wherein the zones are formed by sets of differently spaced holes of similar diameter, similarly spaced holes of different diameter, rings of permeable material of different porosities, or any combination of these methods.
23. The apparatus of claim 17, wherein the conductive layer further comprises a plurality of independently biasable electrical zones.
24. The apparatus of claim 23, wherein the plurality of independently biasable electrical zones further comprises three independently biasable electrical zones formed by the interaction between a first conductive element and a second conductive element disposed in the conductive layer, wherein the second conductive element has an inner edge interleaved with an outer edge of the first conductive element.

25. An apparatus for processing a substrate, comprising;
- a platen assembly having a top surface;
 - a conductive layer disposed on the platen assembly
 - a dielectric processing surface coupled to the conductive layer opposite the platen assembly and having at least two zones of different current permeability defined across the processing surface, wherein the at least two zones are defined by an attribute of the processing surface, comprising:
 - at least one conductive element positioned to contact a side of a substrate disposed on the processing surface;
 - a power source adapted to apply a bias between the conductive element and the conductive layer; and
 - a carrier head disposed above the processing pad assembly and adapted to hold a substrate against the processing pad assembly and provide at least a portion of relative motion therebetween.